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Government Procurement and the Growth of Small Firms

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4 **Abstract**

5 I estimate the causal effects of demand shocks, stemming from government procurement,
6 on the growth of small firms in Ecuador. I assemble a unique dataset using several new
7 administrative sources and, as identification strategy, exploit a governmental procurement
8 process that allocates public contracts through a randomized contest.

9 This paper provides three main contributions to the literature. First, it shows the positive
10 and significant effect of demand shocks on firm growth. On average, an increase in demand of
11 10% will increase wage expenses by 4% and fixed assets by 5% during the year of the shock.
12 Second, it finds no evidence of spill-over effects from demand shocks on sales to the public or
13 private sector. Finally, as in other studies, it is shown that demand positively impacts firm
14 growth but, contrary to other findings, this effect is temporary and only observed during the
15 year of the shock.

16 **Keywords:** Demand Shocks, firm growth, public procurement

17 **J.E.L. Codes:** H54, H57 D22

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1 Introduction

Small firms contribute up to 45% of total employment and 33% of GDP in developing countries (Kushnir et al., 2010). Despite this, the majority of small firms never grow beyond a few employees (Nichter and Goldmark, 2009).¹ The importance of firm-growth for economic and political reasons is evidenced by the number of policies that have been created to promote it.

Economic theory provides two different approaches to explain firm growth. On one hand, firms can grow due to intrinsic factors such as: managerial ability (Lucas, 1978), increases in productivity (Jovanovic, 1982), and experience (Hopenhayn, 1992).² Public policies meant to address intrinsic factors include: access to credit, management development programs, and financial literacy programs. On the other hand, a set of recent papers suggest that demand factors, such as networking and reputation effects (Fishman and Rob, 2003; Syverson, 2004), might be equally important in explaining firm growth. In such cases, public policies that restrict competition and favor small enterprises might have a positive and significant impact on the development of small and medium enterprises (hereafter SMEs). Argentina’s Ley 25.551 (2001) stipulates that goods provided by small firms receive a price margin of 7%; in Brazil, government purchases that are below a minimum threshold are exclusively destined to small firms (Lei Complementar N 123, 2006). This restriction of government procurement processes to certain (by assumption less competitive) firms implies that such programs come at a cost. Are these demand-driven programs effective in promoting SME growth?

To empirically evaluate the effects of demand, the researcher needs to isolate it from other factors. This is a complicated prospect because the relation between demand and growth is unclear. On the one hand, a firm may experience growth due to a shift of the demand curve induced by, for example, changes in preferences or exogenous price increases of substitute products. On the other hand, a firm that grows may benefit from an increase market exposure and economies of scale, leading to an increase in demand. To overcome such identification problems, previous studies have relied on firm-level price data that allows to decompose demand and productivity shocks (Foster et al., 2008). When such detailed information is not available, researchers impose structure on the demand and production functions and obtain estimates of the unobserved demand shocks through the regression residuals (Pozzi and Schivardi, 2016). Hebous and Zimmermann (2016) exploit

¹ Hsieh and Klenow (2009) show that there are significant differences in productivity between firms, even in narrowly defined sectors.

² The empirical evidence corroborates supply-side models. Queiro (2016) presents evidence that managerial education has a significant effect on firm size while Cabral and Mata (2003) find that experience is an important factor in determining firm size.

the timing of public government contracts and estimate that a one dollar increase in government purchases increases the capital investment of US firms by 7 to 11 cents. [Ferraz et al. \(2016\)](#), whose work is the closest to the present one, use a quasi-experimental design based on the bidding process in Brazil. The authors find that winning a contract increases firm growth by 2.2% during the quarter of the shock.

In this study I examine the short- and long-term impacts that demand shocks, stemming from government purchases, have on the financial performance of SMEs. For this purpose, I exploit the *menor cuantia* process, a feature in Ecuador’s public procurement law that awards contracts using a lottery. Using this as a source of variation in demand, I assemble a unique dataset that combines firm level financial information with public purchases records for 1,179 firms that participated in the process for the years 2010-2012. I then compare the changes in balance sheet indicators between the winners and the losers of the contests, at the extensive and intensive margin.

I find that demand shocks significantly affect firms’ short-term growth during the year of the shock. Firms that won a contract report, on average, 22% higher revenues and current assets, and 7% higher fixed assets than firms that did not win. The intensive margin analysis suggests that increasing demand by 10% will increase wage expenses by 4% and current assets by 5%. The effects of demand shocks are temporary and are only observed during the year of the shock. A year after winning a contract, gross revenues and current assets revert back to pre-shock levels and there are no differences in wage expenses and fixed assets between winners and runner-ups of the contest. Moreover, I find that, outside the *menor cuantia* process, there are virtually no differences in sales to the government or the private sector between winners and losers.

This paper contributes to the existing literature on the role of demand on firm growth and to the nascent literature that examines the role of government expenditure on firm dynamics ([Hoekman and Sanfilippo, 2018](#); [Czarnitzki et al., 2018](#)). The main contribution of the paper is that it highlights that the magnitude, nature, and duration of the shocks are important factors to consider when analyzing how demand affects firm growth. Shocks that are perceived as temporary or unsustainable seem to only affect short-term measures of growth. An additional contribution of this paper is that it provides an evaluation of a governmental preferential purchasing program for the particular case of small firms.

The rest of this paper is divided as follows: section 2 explains the country context and procurement mechanism. Section 3 introduces the data. Section 4 discusses the identification strategy and empirical methodology. Section 5 provides the results and section 6 concludes.

79 2 Background

80 2.1 Public procurement in Ecuador

81 Ecuador is a small middle-income country with a 2016 population of 16 million people and a per
82 capita income of \$6,205 (2016). Since the year 2000, the official currency of Ecuador is the U.S.
83 Dollar. Prior to the 2006 election, the country experienced political instability, a financial crisis,
84 and ubiquitous cases of corruption. After the 2006 election, the new government vowed to restore
85 public trust. As part of this plan, it enacted a new constitution, transparency laws and, in 2008,
86 the Public Procurement Law ([LONSCP, 2008](#)). The LONSCP reformed the procedures for the
87 purchase of public goods and introduced provisions to safeguard the participation of SMEs in
88 public procurement. The National Public Purchases Agency defines SMEs as a firm that has less
89 than 100 employees and has sales lower than 2 million dollars ([SERCOP, 2015](#)).

90 As part of the reform in public procurement it was dictated that all government institutions
91 procure all purchases through an on-line portal called Compraspublicas.³ Before Compraspublicas,
92 government procurement was done at a local level, with limited oversight and accountability. More-
93 over, the Law stipulated that the process for the procurement of public works under a threshold,
94 precisely 0.0007% of the government’s budget, had to be done under the so-called *menor cuantia*
95 (“small amount”) process. This process contains two distinct features that are particularly relevant
96 to this study. It is accessible only to SMEs and it grants contracts through a randomized lottery.

97 The *menor cuantia* process functions through the online portal Compraspublicas. The portal
98 connects institutions who procure for services and products (hence projects) with firms, mostly
99 from the construction sector, that bid for them.

100 In order for a firm to bid on a project, it must register in the portal. During this process,
101 firms submit their personal and company information including: contact information, degrees and
102 certificates, tax ID number, personal and company tax returns, inventory of physical capital, and
103 industrial classification of the company. Once registered, firms are able to browse through the
104 public contracts available and place their bids.

105 From the institution’s side, the first step to procure a new public work is to create an entry
106 in Compraspublicas.⁴ The new project has to include a description of the public work, location,
107 budget, timeline, and project-specific requirements. These requirements include: technical and
108 professional experience, qualification of employees, previous experience of the firm, educational

³The site address is www.compraspublicas.gob.ec

⁴Each project must be approved in the government budgetary process. This process is done during the previous fiscal year.

109 status of managers, technical abilities, machinery, and financial capital.

110 After this step, the project enters its first phase: acceptance of bids from firms. There are
111 two ways used to notify firms of a new project. First, the system sends automatic notifications to
112 providers. It does so through an algorithm that compares the requirements listed in the project
113 with the competencies of providers. In addition to contacting providers directly, the system also
114 posts the project on the database of the portal. During this stage, all registered providers are able
115 to search and browse through the available projects and express their interest.⁵

116 In the second phase of the process, all providers that bid on the project must provide proof
117 that they fulfill the requirements specified. They do this by uploading official documentation to
118 Compraspúblicas. For instance, if the project requires specific machinery, then providers must
119 upload the registration and proof of purchase of the equipment. A notable feature of this part of
120 the process is that the requirements for each public work are objective and, in some cases, the
121 system does not allow the provider to complete this phase if they do not meet the minimum cutoffs.

122 Following this phase, a committee from the public institution evaluates all the providers that
123 presented a bid. The committee's responsibility is to identify if each firm meets the minimum
124 requirements for the project- thus supplementing the verification process done by the system. To
125 illustrate, suppose that a new construction project requires a minimum of 2 years of previous
126 experience. An interior design firm could, theoretically, qualify for this process. In this case, it is
127 the role of the committee to verify if the experience listed by the firm is relevant. The committee
128 does not rank nor provide a numerical qualification of providers; it only determines if they are
129 qualified to perform the project. The providers that qualify enter into a pool. In the final phase of
130 the process, the system automatically and randomly selects one provider from the list of qualified
131 providers. This provider is the winner of the contest and is given the contract for the project.

132 The identification strategy in this study relies on the fact that the allocation of the contract
133 is random. For a given public contract all providers that qualify to participate in the lottery
134 have, on average, comparable characteristics. The impartiality of the procurement process is
135 ultimately an empirical question, and is addressed in the empirical section, where it is concluded
136 that *menor cuantia* projects are, indeed, randomly assigned. Moreover, and regardless of any
137 empirical considerations, there are two major features of the process that suggest that contracts
138 are assigned randomly.

139 First, no negotiation between institutions and firms takes place at any stage. The price for a
140 given public work is predetermined and, as a result, no preference is given for one bid being more

⁵During 2012 additional rules were added to the system that prevented certain providers from submitting bids. These rules were not in place during the time period used in this study.

141 competitive than another. This is evidenced by comparing the budgeted and actual costs for a
 142 given project. In the *menor cuantia* process these values always coincide. In public work projects
 143 of higher amounts, which are allocated using different procedures, one can observe considerable
 144 variations between the estimated and actual costs. Second, the requirements that are set for each
 145 contract, while reducing the heterogeneity of firms that qualify, are defined in terms of objective
 146 criteria and must be verified by legal documents.⁶

147 3 Data

148 The data for this study consist of a panel of 1,179 firms that presented bids on a total of 5,475
 149 public works performed under the *menor cuantia* process during the period between May 2009
 150 and December 2012. Firm-level data were obtained from the National Bureau of Companies of
 151 Ecuador (SUPERCIAS) and include contact information, yearly tax returns, and balance sheet
 152 information.⁷ Data of public works performed under the *menor cuantia* process come from the
 153 Ecuadorian Procurement Agency and include contract information for each public work, the unique
 154 identification number of each firm that bid on each project, a list of qualified providers, and the
 155 winner of the contest.⁸ At the time of writing, all data for this project were publicly available
 156 but were not easily accessible. For this reason, the data were obtained by using a web scraping
 157 algorithm. The appendix provides a comprehensive overview of how the data gathering process.

158

159 [Table 1 about here.]

160 The breakdown of qualified firms by year is as follows: 146 in 2009, 543 in 2010, 543 in 2011,
 161 and 546 in 2012. Table 1 presents descriptive statistics for the firms in the sample. The sample of
 162 companies in this study consists principally of small and medium sized firms in the construction
 163 industry. Based on their official registration record, 86% of firms report that their primary special-
 164 ization is construction of buildings, real estate activities, architecture and engineering consulting,

⁶ A potential concern is the discretion the committee has to qualify providers. A committee might try to provide preferential treatment to a firm by being stringent in their review of other firms and thus limiting the number of qualified providers. To overcome this potential limitation, I exclude from the sample a firm if, during any contest, it was the only one qualified into the pool.

⁷All values are obtained from firms' balance sheet documents, as reported to the tax authorities (Servicio de Rentas Internas).

⁸Firm level data can be found at <http://www.supercias.gob.ec>. Public works data can be found at <https://www.compraspublicas.gob.ec>.

or civil engineering. The companies were categorized based on their size by SERCOP.⁹ Medium sized companies make up 8% of the sample and have average gross revenues of \$943,107. Small sized companies make up 44% and have average gross revenues of \$244,590. Micro sized companies make 48% of the sample and have gross revenues of \$84,458. Firms in the sample are young, the average age (years since registration) being 5.1 years. 90% of firms in the sample are less than 13 years old. For the period 2009-2012, each firm qualified to be part in the random drawing an average of 5.04 times per year, winning a contract, on average, 0.80 times per year. Financially, the firms report to have average total assets of \$128,589 and average liabilities of \$98,202. The average wage expenditure is \$25,931 and 90% of firms report wage expenditure of less than \$60,000.¹⁰ Geographically, 55% of the firms in the sample are located in the 10 most populous cities in Ecuador, where approximately 50% of the total population live.

[Table 2 about here.]

Table 2 provides the description of the 5,475 public works used in the study. The average contract amount is \$50,000 and approximately 70% of contracts are worth less than \$60,000. Figure 1 shows the distribution of the values of public works for the years 2009-2012. The average contract duration (length of time required for a provider to complete the project) is 64 days and 90% of contracts last less than 96 days. The average contract has 6 requirements. On average, 17 providers qualified for the public contest per contract. The data obtained from the procurement agency suggests that all but 16 of the 5,475 public works were completed and delivered.¹¹

[Figure 1 about here.]

4 Empirical Strategy

The purpose of this study is to estimate the causal effects of demand shocks on firm growth. To capture different areas of growth, I use four different measures: gross revenues, wage expenses and

⁹A micro firm has between 1 and 9 employees and gross sales and assets of less than \$100,000. A small firm has between 10 and 49 employees and sales and assets between \$100,000 and 1 million dollars. A medium firm has between 50 and 99 employees and sales between 1 and 2 million dollars.

¹⁰A back-of-the-envelope calculation suggests that 90% of firms have less than 3-7 permanent employees.

¹¹The remaining 16 public works were terminated unilaterally. There is no information that describes the reasons for the termination. In the robustness section, I exclude those providers that participated in those contests.

189 fixed and current assets.¹²

190 Assume that the relationship between firm growth and demand can be represented by the
191 following reduced-form model:

$$\dot{y}_{it} = \beta_0 + \beta_1 d_{it} + X_{it}\beta_2 + \mu_i + \epsilon_{it} \quad (1)$$

192 where \dot{y}_{it} denotes the growth of firm i during period t , d_{it} is the demand faced by the firm
193 during year t , X_{it} is a matrix of firm-specific covariates, μ_i denotes unobserved time-invariant
194 firm characteristics, and ϵ_{it} is the error term. I define \dot{y}_{it} to be the difference in logs: $\dot{y}_{it} =$
195 $\ln(y_{it}) - \ln(y_{it-1}) \forall y \in \{ \text{gross revenues, wage, and fixed and current assets} \}$.¹³ Estimating
196 this model by ordinary least squares will yield biased results if the demand faced by the firm is
197 correlated with unobserved firm characteristics, μ_i , which is likely the case.

198 To eliminate μ_i , one could transform the model by first differencing it. Even though this trans-
199 formation eliminates μ_i , estimating the differenced model by OLS will provide a biased estimate if
200 $\mathbf{E}[\Delta\epsilon_{it}, \Delta d_{it}] \neq 0$, i.e changes in demand are correlated with time-variant unobserved firm charac-
201 teristics. To overcome this identification problem, one needs to identify a source of demand that
202 is exogenous.

203 The increase in demand caused by winning a *menor cuantia* contests provides the source
204 of exogenous variation needed to obtain unbiased estimates. Conditionally on qualifying, the
205 random nature of the lottery ensures that the contract allocation is independent of firm specific
206 characteristics. The firms that did not win the contract (runner-ups) serve as an appropriate
207 counterfactual to obtain the effects of demand shocks on growth.

208 There are two main concerns with using the contracts allocated under *menor cuantia* as an
209 exogenous source of demand. The first concern is that the lottery may not be random. This
210 would occur if companies or the public institutions were able to manipulate the system. The
211 second concern is participation. Firms can submit bids for multiple projects on a given year. To
212 participate in a lottery, each firm must qualify to enter into the pool. If more productive firms
213 qualify to more contests, then the probability of winning under the process increases. In this case,
214 even if contracts are allocated using a lottery, they are not exogenous to firm characteristics.

215 These concerns can be tested empirically. The probability of winning a contest at time t should
216 be orthogonal to any firm level characteristics observed at time $t - 1$. Table 3 shows the results of a
217 difference in means two-sample t-test for the firms that qualified for the public contest during 2009-

¹² For revenues I use total sales; for wages I use the total expenditure on salaries, wages, and commissions; for fixed assets and currents I use the definition as stated in the International Financial Reporting Standards (IFRS).

¹³For robustness, I also use an alternative definition of growth defined as: $\dot{y}_{it} = \frac{y_{it} - y_{it-1}}{.5(y_{it-1} + y_{it})}$

218 2012. The difference in means were compared for winners and runner-ups of the contest. There
 219 are no significant differences between winners and runner-ups. Additional exercises (presented in
 220 the appendix) compare the theoretical and actual distributions of winners and runner-ups over
 221 time.¹⁴

222 [Table 3 about here.]

223 In addition to this evidence, the lottery is done through Compraspública. This portal is
 224 constantly audited by external reviewers and neither firms nor institutions have administrative
 225 access to the site. Finally, the sample in this study excludes a firm if during any contest they won
 226 because there was only 1 qualified provider in the lottery. All this evidence supports the claim that
 227 the assignment of contracts is in fact random. For this reason, I estimate the following reduced
 228 form model:

$$\dot{y}_{it} = \beta_0 + \beta_1 d_{it} + X_{it}\beta_2 + \epsilon_{it} \quad (2)$$

229 I proceed in two steps. First, I estimate equation 2 on the the extensive margin, by comparing
 230 winners of the contest with those that did not win. In this specification \dot{y}_{it} is the measure of
 231 growth for company i at time t , d_{it} equals 1 if the firm wins a contract during the year t and 0
 232 otherwise, and X_{it} represents firm specific controls. I include as controls age and location of the
 233 firm, a vector of controls that account for geographic characteristics, and regional GDP indicators.
 234 All specifications control for time and region fixed effects.

235 In the second step, I estimate the effect of demand shocks on the intensive margin. To measure
 236 the intensive margin, I estimate equation 2 defining d_{it} to be the log of sales from *menor cuantía*.
 237 The coefficient β_1 shows how percent changes in exogenous demand affect different measures of
 238 firm growth. To estimate if demand shocks have an effect beyond the year of the shocks, I look at
 239 growth at different time intervals, $\dot{y}_{it+i} \forall i \in \{1, 2, 3\}$.¹⁵

240 What does \dot{y}_{it} measure? During the year of the shock, \dot{y}_{it} shows the difference in growth
 241 between winners and losers, with $t - 1$ being the year of reference. A priori, one would expect
 242 to see significant differences in measures of growth between winners and losers. This is because
 243 winning an additional contract directly impacts balance sheet indicators such as sales and current

¹⁴The probability of winning a contest is inversely proportional to the number of providers that qualified to the contest.

¹⁵This is of particular importance given that the preferential procurement programs that create the demand shocks have been presented as facilitating growth. For instance, an increase in cash flow due to additional demand might alleviate budget or credit constraints. This might motivate firms to invest in capital or labor.

asset during the year that the shock occurs. Nonetheless, it is still plausible to observe no differences between winners and runner-ups of the contest during the year of shock. For instance, if firms were capacity constrained, i.e. could only perform a limited number of contracts on a given year, then firms that win contracts from *menor cuantia* will not be able to perform additional work. Analogously, firms that did not win the contest, could seek work in the private sector. Under this scenario, firms replace private contracts with public ones, causing no overall changes in the total amount of work performed. It is worth noting, however, that the fact that firms apply to the *menor cuantia* contest suggests that they are not capacity constraint.¹⁶

5 Results

I begin this section by presenting the effects of demand shocks on growth, at the extensive margin during the year of the shock, shown in table 4. I estimate equation 2 by least squares, the independent variable *winner* takes the value 1 if a firm won a contest at time t and 0 otherwise. Each specification controls for time and region fixed-effects and clusters errors at the firm level. The dependent variable in columns 1 and 2 is revenue growth. Firms that experienced a demand shock report, on average, approximately 22% higher revenues than firms that did not experience a shock. The coefficient of .202 is significant at the 1% level and is robust to the addition of controls. Columns 3 and 4 present the results for growth of wage expense. The estimated coefficients suggest that firms that win a contract spend, on average, 5% more on wages than non winners. These results, however, are not robust to the inclusion of additional controls. Columns 4 and 5 report the results on growth of fixed assets. Firms that win a contract report, on average, 7% higher fixed-assets than non-winners. Columns 7 and 8 report the results on current assets. The coefficients are significant at the 1% level and similar in magnitude to the coefficients estimated for growth of revenues.

Overall the results from table 4 suggest that demand shocks affect firm growth in two distinct manners. For immediate measures of growth, such as revenues or current assets, there is a direct relationship between demand shocks and growth. To illustrate, given that the average yearly revenue of a firm for the sample is \$269,230, the estimated coefficient on revenue suggests that winning a contest increases the measure by approximately \$ 59,000 which is very close to the average value of a *menor cuantia* contract (\$50,000). At the same time, the results show that for other measures of growth, such as wages and fixed assets, this relationship, while positive, has a

¹⁶An additional explanation would be if firms could easily manipulate the balance sheet information, for instance to avoid taxation, then this would account for the lack of changes observed.

274 lower a magnitude and statistical significance.

275 [Table 4 about here.]

276 Next, I examine the effects of demand shocks on growth at the intensive margin. I estimate
277 equation 2 by least squares, where the independent variable is the log of total yearly revenue
278 received from *menor cuantia*. Table 5 presents the estimation results.

279 [Table 5 about here.]

280 Columns 1 and 2 show the results for revenue growth, suggesting that an increase of 10%
281 in sales will increase declared revenue by 10%. While ostensibly trivial, this result provides a
282 good indication that the financial statements used in this study are a reliable source to measure
283 the financial performance of firms. Columns 3 and 4 present the results for the growth of wage
284 expense. The estimated coefficient of 0.05 is significant at the 1% level and does not change with
285 the addition of controls. This suggests that an increase of 10% in the demand will increase wage
286 expenses by 5%. Columns 5 and 6 present the results on growth of fixed assets, the coefficients and
287 suggest that an increase of 10% in the demand will increase wage expenses by 7%. The results,
288 on fixed assets are only significant at the 10% level. Columns 7 and 8 report the results of current
289 assets and suggest that an increase of 10% in the demand will increase wage expenses by 20%.
290 Overall, the results from the intensive margin analysis are similar in magnitude and significance
291 to the ones presented in table 4.

292 Next, I examine the duration of the effects. This is of particular relevance given that the changes
293 observed could be due to short-term reasons such as hiring more labor to fulfill the contract or
294 renting machinery required for a project. Figure 2 shows the differences in growth rates between
295 firms that won a *menor cuantia* contract and those that did not. The differences are shown for
296 the first three years after the contest. The figure shows the coefficient for growth estimated using
297 equation 2 with the 95% confidence interval. The dependent variable is the growth rate in gross
298 revenues, wage expense, and fixed and current assets. The figure reveals two significant insights.
299 First, the year after the shock, winners of the *menor cuantia* contest experience a decrease in gross
300 revenues and current assets. The decrease the year after the shock is similar in magnitude than
301 the increase experienced the year of the shock. No effect is observed the year after the shock for
302 labor costs and fixed assets. Second, no effects in any measure of growth are observed two years
303 after the shock.

304 [Figure 2 about here.]

305 One non-pecuniary benefit of winning a contract is that it gives firms experience, reputation,
306 and contacts in the procurement process. In this case, it is possible for winning firms to increase
307 their sales to the government outside of the *menor cuantia* process. Table 6 provides the results
308 of testing the difference in means of the the sales to the government between the winners and
309 runner-ups. There are virtually no differences in sales to the government after the year of the
310 shock.

311 I perform several robustness checks (see appendix) to examine the sensitivity of the results.
312 First, I estimate the results looking at each year individually. Second, I use an alternative defini-
313 tions of growth. Third, I estimate the results defining the dependent variable in levels instead of
314 growth. Fourth, I do a two stage estimation using the sales from *menor cuantia* as instrument for
315 total yearly sales. The results are not affected by the use of these alternative specifications.

316 [Table 6 about here.]

317 6 Discussion and conclusions

318 In this paper I estimate the causal effects of demand shocks, stemming from government procure-
319 ment, on firm growth using as a source of exogenous variation the shocks from the *menor cuantia*
320 *process*. I find that in the short-term, demand shocks significantly affect firm growth. Firms that
321 win the contest report higher revenues and assets and spend more on wages and short-term assets
322 than those that did not. The short-term results are consistent with recent findings in [Hebous](#)
323 [and Zimmermann \(2016\)](#) and [Ferraz et al. \(2016\)](#). Contrary to their findings, however, there is
324 no evidence of an increase in growth in the years following the shock. Similarly, no differences in
325 additional sales to the government or the private sector are observed.

326 The evidence presented in this paper suggests that government procurement has limited long-
327 term impact on the growth of small firms. There are, however, important caveats concerning the
328 generalization of these results. The short and aleatory nature of the *menor cuantia* process may
329 affect how firms perceived the shock. Firms may be hesitant to invest in long-term assets or hire
330 permanent workers if the change in demand is perceived as unsustainable or temporary. Similarly,
331 the small amount and short duration of the projects might imply that firms can accommodate the
332 increase in demand by hiring temporary staff. Further studies are needed to understand how the
333 nature, magnitude, and duration of the demand shocks impact the long-term growth of SMEs.

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377 A Robustness

378 I perform several robustness checks to examine the sensitivity of the results. In table 7, I estimate
379 the results looking at each year individually. In table 8, I estimate growth using an alternative
380 definition of growth, $\frac{y_t - y_{t-1}}{.5 * (y_t + y_{t-1})}$ Ferraz et al. (2016). In table 9, I estimate the results defining the
381 dependent variable in levels instead of growth. Finally, I do a two stage estimation using the sales
382 from menor cuantia as instrument for total yearly sales (available upon request).

383 [Table 7 about here.]

384 [Table 8 about here.]

385 [Table 9 about here.]

386 B Random Assignment Tests

387 In this section I perform several empirical tests to check the *menor cuantia* assignment mechanism.
388 I start by constructing a theoretical distribution of the number of times that participants are
389 expected to win a contest and compare this, using a χ^2 test, with the realized distribution. It
390 is important to note that the process involves both firms and individuals and as a result, I use
391 all participants for this exercise. The construction of the theoretical distribution is based on the
392 fact that the probability of winning a contest is inversely proportional to the number of qualified
393 providers.

394 For any contest j held at time t , let $d_{kjt} = i$, $i \in \{1, 0\}$ be an indicator variable taking value 1
395 if the provider k wins the contest and 0 otherwise. For each individual contest j , the probability
396 of winning is the inverse of the number of participants n that qualify to enter $P(d_j = 1) = \frac{1}{n_j}$. It
397 follows that the expected value of the number of contracts, $D_{it} = 1$, of wins by a provider can be
398 represented by:

$$\mathbb{E}_k[D_i = 1] = \sum_j^J P(d_j = 1)$$

399 where $\mathbb{E}_k[D_i = 1]$ depends on two factors: the total number of contests J that a given provider
400 participated in and the number of qualified providers participating in each contest. It is therefore
401 possible to derive a theoretical distribution of the number of expected winnings by provider, and

402 test the theoretical results with the observed data. Let X_i be firm specific covariates, then:

403

404 **Proposition 1** *The probability of winning a contest at time t is orthogonal to firm level characteristics*
405 *X_i observed at time $t - 1$*

406

407 **Proposition 2** *The theoretical and actual frequency distributions of provider winnings are not different.*

408

409 Note also that the process implies that events should be independent of time. As a result, it
410 is expected that winning a contest during $t - 1$ should not affect the probability of winning the
411 contest at time t .

$$\mathbb{E}_k[D_{it}|D_{it-1}] = \mathbb{E}_k[D_{it}] = \sum_{j_t}^{J_t} P(d_j = 1)$$

412 **Proposition 3** *Winning a contest during year t does not affect the probability of winning a contest during*
413 *year $k \forall t, k \in (2009, 2010, 2011, 2012)$ where $t \neq k$*

414

415 Proposition 1 is tested and presented in the text. Proposition 2 is tested by using the χ^2 test
416 using the actual and theoretical distributions. The results are presented in table C.3 . For this, I
417 use all of the contest won by all providers during the 2009-2012. I pooled the providers that won
418 more than 12 times. This was done as the number of expected providers in each of those categories
419 was less than five. I fail to reject the null hypothesis at the 10% level.

420 [Table 10 about here.]

421 Proposition 3 is tested using a similar mechanism as in proposition 2 but only include those
422 providers that qualified for a given contest in two given years. Results are presented in table C.3.
423 I fail to reject the null hypothesis on all three cases at the 10% level.

424 [Table 11 about here.]

425 C Data Gathering Process

426 In this section I describe the data gathering process for this project. A technical document de-
427 scribing the programming scripts is available upon request.

428 The data gathering process was divided into three phases. The first phase consisted on obtaining
429 detailed information on all the public purchases performed under the *menor cuantía* processes for
430 the years 2008-2012 in Ecuador. This provided information on each public purchase as well as
431 all individuals and firms that submitted a bid to participate in each public work. The second
432 phase of the project consisted on obtaining detailed information on each individual and firm that
433 participated in the *menor cuantía* process during the sample period. The third and final phase of
434 the project, consisted on cleaning and entering this information into a database.

435 C.1 Phase I

436 The purpose of this phase was to obtain all public works done under the *menor cuantia* process
437 for the years 2008-2012. To do this, I first downloaded a master file that contained all purchases
438 done by public institutions in Ecuador for the years 2009-2015. The file was downloaded from the
439 website of the public procurement agency (SERCOP)¹⁷

440 This master file contained all purchases done by the government; including those done under
441 processes other than the *menor cuantia*. Next, I selected the universe of all purchases under *menor*
442 *cuantia*, which include their respective dates of publication. For each purchase, the file made
443 available a description of the procurement process used, a purchase code, dates of the purchase,
444 and other information. This file, however, did not provide the level of detail needed for the project.
445 To obtain this additional information, a personalized data scrap code searched and downloaded all
446 the meta-data. This required doing a personalized search for each public work in the sample. The
447 gathering was restricted to the purchases which 1) were finalized 2) had a unique id number and
448 3) were awarded to only one contractor. 28,957 out of the total 32,551 public works in the *menor*
449 *cuantia* met this criteria and form the universe of public works for the project.

450 The process above was done in three different batches during the year 2015. The first batch was
451 a pilot project done in March 2015. The second batch took place between April and June 2015.
452 The third batch was done in August 2015. For each of the 28,957 files, there were 9 pages that
453 were downloaded: 1) basic information on the contract including length, terms of payment, and
454 contacts, 2) information on the important dates of the public work, 3) information on the providers
455 that had been invited, 4) information on the requirements for the public works, 5) information on
456 the results of the contest, and 6) information on the providers that were qualified, 7) information

¹⁷The website link is: <http://portal.compraspublicas.gob.ec/sercop/analisis-sercop/>. After opening the link, it is necessary to click under “Reportes del Sistema de Contratación Pública” which will provide a login to the database. Once inside the database, one can choose to download a report containing all information. This file was obtained on February 15th, 2015

457 on the products or services that were required, 8) a section for questions and answers, and 9) an
458 archive with all files for the process.

459 C.2 Phase II

460 In phase II of the project, I obtained financial information on the firms and individuals that par-
461 ticipated in the *menor cuantía* process. The meta-data, gathered in the previous phase, provided
462 information on all providers that submitted a bid to perform the public work. Each provider has
463 a unique identification number used for tax purposes (RUC or registro único del contribuyente).
464 There are two different types of providers: firms and self-employed. By law, financial information
465 for firms is available at the Superintendencia de Companias, (SUPERCIAS). SUPERCIAS is a
466 government institution and all companies must provide financial records, tax statements, and con-
467 tact information to them. SUPERCIAS makes this information publicly available through their
468 website.

469 Repeated requests to obtain the data on companies went unanswered. As a result, an automated
470 program was created to obtain this information.¹⁸ I downloaded two types of data. The first
471 included basic company information and was scrapped directly from the website. The second
472 included all yearly financial statements on record for that company. The statements were stored as
473 PDF documents in two different formats: 1) a scanned image and/or 2) a structured document. To
474 obtain the financial data from the structured document, I ran several scripts to do so automatically.
475 To obtain data from the scanned images, it was necessary to enter the information manually. For
476 this, I adopted the help of several research assistants.

477 C.3 Phase III

478 In this phase of the project I had to enter the financial information into a database. Financial
479 information after 2011 was available in a PDF format. The data from this file was extracted
480 using an automated scripts. Figure 3 provides a sample of the balance. For balances that were
481 scanned copies of documents, the data was entered manually and verified by at least an additional
482 worker and was tested using accounting principles. Figure 4 and figure 5 provide an example of
483 the financial information available as scanned documents.

484 The final phase involved testing all information gathered to ensure it was consistent. First, to
485 ensure that all public works were collected accurately, a manual check was done on 300 randomly

¹⁸In order to minimize the risk of skipping some companies, I performed the scraping 3 times on those companies I was not able to find.

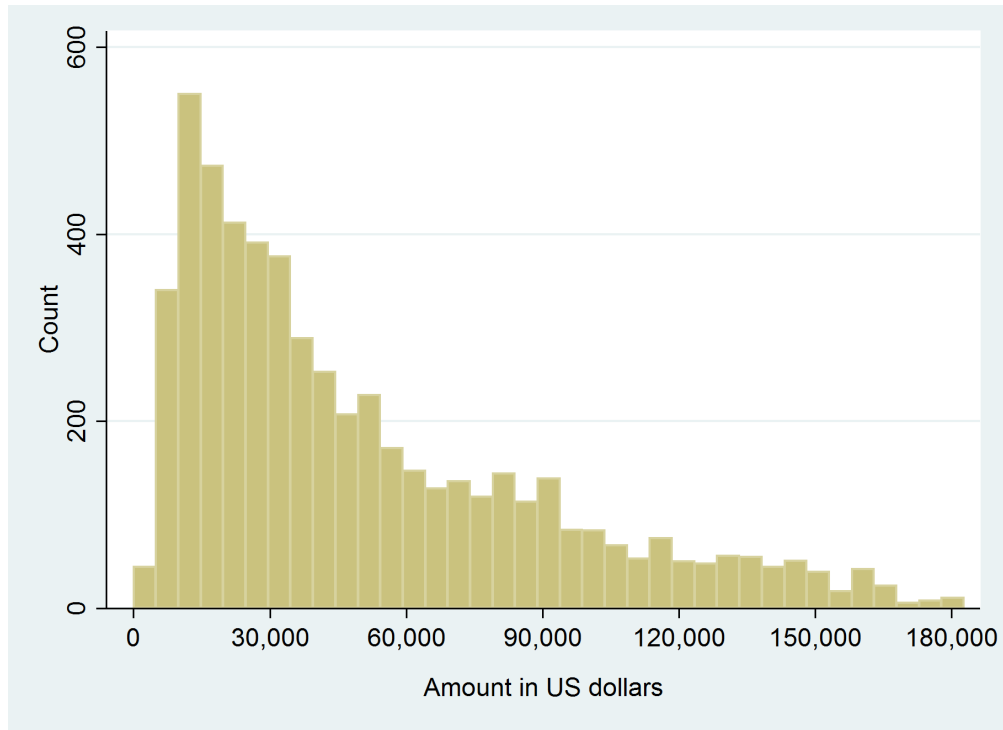
486 selected public works. A second check was ensuring that the costs indicated in the master file were
487 consistent with the one indicated on each public work. Additionally, each public work was entered
488 into a SQL database which ensured that public works were only entered once and that any major
489 integrity problem was identified.

490 [Figure 3 about here.]

491 [Figure 4 about here.]

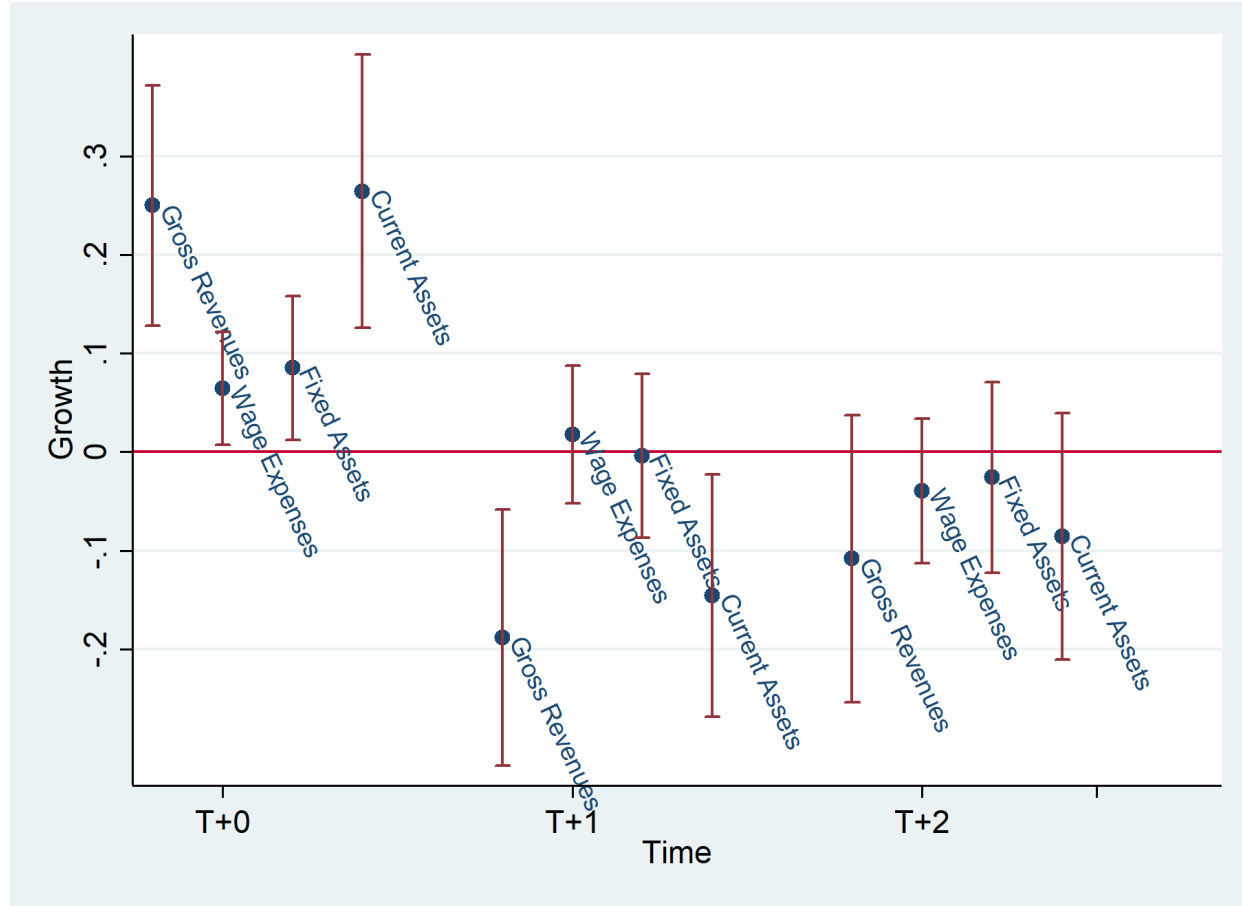
492 [Figure 5 about here.]

Figure 1: Contract amount of public works under *menor cuantia* process: 2009-2012




The figure above provides the contract amount of the 5,475 public works in the sample performed between in the *menor cuantia* process for the years 2009-2012. The values for public works are presented in US dollars.

Figure 2: Growth following the years after winning a contract



The figure above contains average growth rates $t + k, k \in (1, 2, 3)$ years after winning a contract under the *menor cuantia* process. Growth is defined as the log differences. The bars represent the 95% confidence interval. The figure was created using the results from estimating equation 2 by least squares. The dependent variable is a dummy variable taking the value 1 if a firm won a contest at time t and 0 otherwise. Standard errors (in parenthesis) are clustered at the firm level. Controls include age of the firm, the numbers of contests that a firm qualified for during the year, the size of a firm, local GDP and construction permits issued during the year.

Figure 3: Sample financial information



SUPERINTENDENCIA
DE COMPAÑÍAS

RAZÓN SOCIAL	CONSTRUCTORA GARCIA SALTOS CIA. LTDA.
DIRECCIÓN	JOSE MARIA VELASCO IBARRA S/N Y 10 DE NOVIEMBRE
EXPEDIENTE	385
RUC	1891735428001
AÑO	2011
FORMULARIO	SC.NEC.385.2011.1

FECHA DE LA JUNTA QUE APROBÓ LOS ESTADOS FINANCIEROS (DD/MM/AAAA)	10/04/2013
---	------------

ESTADO FINANCIERO BAJO NEC PARA LA SUPERINTENDENCIA DE COMPAÑÍAS

OPERACIONES CON PARTES RELACIONADAS DEL EXTERIOR EN EL EJERCICIO ECONOMICO

CUENTA	CÓDIGO	VALOR US\$
ACTIVO CON PARTES RELACIONADAS DEL EXTERIOR	11	
PASIVO CON PARTES RELACIONADAS DEL EXTERIOR	12	
INGRESO CON PARTES RELACIONADAS DEL EXTERIOR	13	
EGRESO CON PARTES RELACIONADAS DEL EXTERIOR	14	
TOTAL OPERACIONES CON PARTES RELACIONADAS DEL EXTERIOR	15	

BALANCE GENERAL (NEC 1)

ESTADO DE RESULTADOS (NEC 1)

CUENTA	CÓDIGO	VALOR US\$	CUENTA	CÓDIGO	VALOR US\$
CAJA - BANCOS	311	4.737,69	VENTAS NETAS LOCALES GRAVADAS CON TARIFA 12%	601	78.252,27
INVERSIONES CORRIENTES	312		VENTAS NETAS LOCALES GRAVADAS CON TARIFA 0%	602	
CUENTAS Y DOCUMENTOS POR COBRAR CLIENTES CORRIENTE RELACIONADOS LOCALES	313		EXPORTACIONES NETAS	603	
CUENTAS Y DOCUMENTOS POR COBRAR CLIENTES CORRIENTE RELACIONADOS DEL EXTERIOR	314		OTROS INGRESOS PROVENIENTES DEL EXTERIOR	604	
CUENTAS Y DOCUMENTOS POR COBRAR CLIENTES CORRIENTE NO RELACIONADOS	315		RENDIMIENTOS FINANCIEROS	605	
			OTRAS RENTAS GRAVADAS	606	

The figure above presents a financial return from a firm in the sample, available as a structured format. The data from this balance can be obtained from an automated script.

Figure 4: Sample financial information

FORMULARIO		DECLARACIÓN DEL IMPUESTO A LA RENTA Y PRESENTACIÓN	
101	DE BALANCES FORMULARIO ÚNICO SOCIEDADES Y	No. FORMULARIO	
Resolución No.	ESTABLECIMIENTOS PERMANENTES	27149721	
NAC-DGER 2008-1520			
100 IDENTIFICACIÓN DE LA DECLARACIÓN		(O) ORIGINAL - (S) SUSTITUTIVA	031 <input type="checkbox"/>
AÑO 102	2009	No. FORMULARIO QUE SUSTITUYE	104 <input type="checkbox"/>
200 IDENTIFICACIÓN DEL SUJETO PASIVO		EXPEDIENTE	203 6543
RUC 201	1190082470001	202	GUIGONVECA SOCIEDAD ANONIMA
OPERACIONES CON PARTES RELACIONADAS DEL EXTERIOR EN EL EJERCICIO FISCAL (INFORMATIVO)			
Activo con partes relacionadas del exterior	011 <input type="checkbox"/>	Ingreso con partes relacionadas del exterior	013 <input type="checkbox"/>
Pasivo con partes relacionadas del exterior	012 <input type="checkbox"/>	Egreso con partes relacionadas del exterior	014 <input type="checkbox"/>
TOTAL OPERACIONES CON PARTES RELACIONADAS DEL EXTERIOR (011 + 012 + 013 + 014)			015 <input type="checkbox"/>
ESTADO DE SITUACIÓN		ESTADO DE RESULTADOS	
ACTIVO		INGRESOS	
ACTIVO CORRIENTE		Ventas netas locales gravadas con tarifa 12%	801 <input type="checkbox"/>
Caja, bancos	311 642.93	Ventas netas locales gravadas con tarifa 0%	802 215,125.72
Inversiones corrientes	312 <input type="checkbox"/>	Exportaciones netas	803 <input type="checkbox"/>
Cuentas y documentos por cobrar - corrientes		Otros ingresos provenientes del exterior	804 <input type="checkbox"/>
Relacionados / Locales	313 <input type="checkbox"/>	Rendimientos financieros	805 <input type="checkbox"/>
Relacionados / Del exterior	314 <input type="checkbox"/>	Otras rentas gravadas	806 <input type="checkbox"/>
No relacionados / Locales	315 <input type="checkbox"/>	Utilidad en venta de activos fijos	807 <input type="checkbox"/>
No relacionados / Del exterior	316 <input type="checkbox"/>	Dividendos percibidos locales	808 <input type="checkbox"/>
Otras cuentas y documentos por cobrar - corrientes		Rentas exentas provenientes de donaciones y aportaciones	

The figure contains a financial return available as scanned copies. The data from this balance was obtained via manual entry.

Figure 5: Sample financial information

FORMULARIO 107		DECLARACIÓN DE VALORES DE BALANCES FORMULARIO 107		No. 50 02157567	
199 IDENTIFICACIÓN DE LA DECLARACIÓN				Nº. DE FORMULARIO QUE SUSTITUYE	
AÑO 2008				IMPORTANTE: SÍRVASE LEER INSTRUCCIONES AL REVERSO	
200 IDENTIFICACIÓN DEL SUJETO PASIVO				EXPEDIENTE 106663	
RUC 0992224355				RAZÓN O DENOMINACIÓN SOCIAL LINSATA SA.	
OPERACIONES CON PARTES RELACIONADAS DEL EXTERIOR EN EL EJERCICIO					
ACTIVO CON PARTES RELACIONADAS DEL EXTERIOR		991	+	INGRESO CON PARTES RELACIONADAS DEL EXTERIOR	+
PASIVO CON PARTES RELACIONADAS DEL EXTERIOR			+	EGRESO CON PARTES RELACIONADAS DEL EXTERIOR	+
OTRAS OPERACIONES CON PARTES RELACIONADAS DEL EXTERIOR					
ACTIVO					
ACTIVO CORRIENTE		VENTAS NETAS LOCALES GRAVADAS CON TARIFA 12%			
CAJA, BANCOS		+	9155549	VENTAS NETAS LOCALES GRAVADAS CON TARIFA 0%	+
INVERSIONES CORRIENTES		+	-	EXPORTACIONES NETAS	+
RELACIONADOS	LOCALES	+	-	OTROS INGRESOS PROVENIENTES DEL EXTERIOR	+
	DEL EXTERIOR	+	-	RENDIMIENTOS FINANCIEROS	+
NO RELACIONADOS	LOCALES	+	49440.60	OTRAS RENTAS GRAVADAS	+
	DEL EXTERIOR	+	-	UTILIDAD EN VENTA DE ACTIVOS FUJOS	+
RELACIONADOS	LOCALES	+	4976900	DIVIDENDOS PERCIBIDOS LOCALES	+
	DEL EXTERIOR	+	-	DE RECURSOS PÚBLICOS	+
NO RELACIONADOS	LOCALES	+	-	DE OTRAS LOCALES	+
	DEL EXTERIOR	+	-	DEL EXTERIOR	+
(-) PROVISIÓN CUENTAS INCOBRABLES		(-)	-	OTRAS RENTAS EXENTAS	+
CRÉDITO TRIBUTARIO A FAVOR DEL SUJETO PASIVO (IVA)		+	5628932		+

The figure contains a financial return available as scanned copies. The data from this balance was obtained via manual entry.

Table 1: Descriptive statistics of firms

	2009	2010	2011	2012	Total
Avg. age (years)	5.41	5.68	4.97	4.69	5.14
Avg. number of qualifications	2.16	6.76	5.68	4.67	5.41
Avg. number of winnings	0.52	0.88	0.82	0.77	0.80
Avg. yearly revenue (USD)	255,137	291,232	291,162	233,392	269,230
Avg. total assets(USD)	113,570	133,844	129,358	126,885	128,589
Avg. liabilities (USD)	90,084	105,213	100,211	91,743	98,202
Avg. wage expense (USD)	24,146	22,351	25,508	29,778	25,931

¹ Descriptive statistics of 1,179 registered firms participating in the *menor cuantia* process for the years in the sample. Values are arithmetic averages. Income, assets, liabilities, and wage expense are presented in U.S. dollars. Assets (liabilities) include fixed and current assets (liabilities).

Table 2: Descriptive statistics of public works by year 2009-2012

	2009	2010	2011	2012	Total
Avg. contract amount (USD)	39,794	46,960	53,468	54,600	50,160
Avg. duration of contract (days)	57	63	69	65	65
Avg. days to submit a bid	8	7	7	7	7
Avg. number of qualified providers per contest	12	19	19	14	17
N. of contracts awarded	468	2034	1626	1347	5475

¹ Descriptive statistics of the 5,475 public works used in this study by year of procurement. Values are arithmetic averages of variables. Contract amount is measured in U.S. dollars. Length of contract is measured in days.

Table 3: Difference in means Student t-test results by year

Variable	Runner	Winner	P value
2010			
Log total assets (USD)	10.00	10.16	0.43
Log total liabilities (USD)	10.03	10.38	0.12
Log current assets (USD)	9.39	9.73	0.11
Log fixed assets (USD)	9.43	9.71	0.20
Log current liabilities (USD)	9.64	10.05	0.13
Log fixed liabilities (USD)	10.38	10.35	0.92
Log revenue (USD)	11.66	11.70	0.82
Log wage expenditure (USD)	9.19	9.49	0.14
Firm age (years)	5.57	5.82	0.60
2011			
Log total assets (USD)	10.17	9.76	0.12
Log total liabilities (USD)	10.25	9.93	0.14
Log current assets (USD)	9.69	9.38	0.14
Log fixed assets (USD)	9.55	9.44	0.59
Log current liabilities (USD)	9.98	9.66	0.12
Log fixed liabilities (USD)	10.23	10.02	0.54
Log revenue (USD)	11.46	11.42	0.85
Log wage expenditure (USD)	9.24	9.00	0.13
Firm age (years)	5.22	4.70	0.25
2012			
Log total assets (USD)	9.57	9.61	0.83
Log total liabilities (USD)	9.97	9.81	0.46
Log current assets (USD)	9.15	9.22	0.72
Log fixed assets (USD)	9.67	9.45	0.29
Log current liabilities (USD)	9.72	9.46	0.24
Log fixed liabilities (USD)	9.64	9.92	0.42
Log revenue (USD)	11.13	11.23	0.70
Log wage expenditure (USD)	9.37	9.29	0.59
Firm age (years)	4.86	4.51	0.43

¹ The following table presents the results from a t-test difference in means exercise for the firms participating in the *menor cuantia* contest. The term “winners” refer to the firms that won in the *menor cuantia* process whereas the term “runner” denotes the firms that did not win. The variables are the lags of the log values.

Table 4: Effect of demand shocks on firm growth: extensive margin

Dependent Variable	Revenue Growth		Wage Growth		Fixed Assets Growth		Current Assets Growth	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Winner	0.245*** (0.062)	0.202*** (0.064)	0.048* (0.029)	0.043 (0.028)	0.081** (0.037)	0.068* (0.038)	0.254*** (0.068)	0.200*** (0.071)
Age of Firm		-0.016 (0.012)		0.004 (0.006)		-0.001 (0.009)		-0.076*** (0.013)
Contests participated		0.005** (0.002)		0.002 (0.001)		0.002 (0.003)		0.006** (0.003)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size of firm	No	Yes	No	Yes	No	Yes	No	Yes
Regional controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1778	1771	1778	1771	1778	1771	1778	1771
R^2	0.014	0.023	0.025	0.044	0.005	0.013	0.029	0.050

¹ Least squares estimation of the effects of winning a procurement contract on firm growth. The dependent variables is growth (log differences) of: revenue (columns 1 and 2), wage expense (columns 3 and 4), fixed assets (columns 5 and 6), and current assets (columns 7 and 8). The variable winner is a dummy variable taking the value 1 if a firm won a contest at time t and 0 otherwise. Standard errors (in parenthesis) are clustered at the firm level. Age of a firm is reported in years. Contest participated refers to the numbers of contests that a firm qualified for during the year. The size of a firm are a set of dummies that control for the size (as defined by the bureau of companies of Ecuador) of the firm. The regional controls include: local GDP and construction permits issued during the year. P values $*p < .1$, $**p < .05$, $***p < .01$

Table 5: Effect of demand shocks on firm growth: intensive margin

Dependent Variable	Revenue Growth		Wage Growth		Fixed Assets Growth		Current Assets Growth	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Revenue from Menor Cuantia	0.11*** (0.03)	0.09*** (0.03)	0.05*** (0.02)	0.04** (0.02)	0.05** (0.02)	0.05** (0.02)	0.20*** (0.04)	0.21*** (0.04)
Age of firm		-0.00 (0.00)		-0.00 (0.00)		0.00 (0.00)		-0.00*** (0.00)
Contests participated		0.00* (0.00)		0.00 (0.00)		0.00 (0.00)		0.00 (0.00)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size of firm	No	Yes	No	Yes	No	Yes	No	Yes
Regional controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1380	1380	1380	1380	1380	1380	1380	1380
R^2	0.017	0.025	0.029	0.058	0.006	0.012	0.050	0.060

¹ Least squares estimation of the effects of winning a procurement contract on firm growth. The dependent variables are the growth (log differences) of revenue (columns 1 and 2), wage expense (columns 3 and 4), fixed assets (columns 5 and 6), and current assets (columns 7 and 8). The variable revenue from Menor Cuantia is the log of revenues obtained from the menor cuantia contest. Standard errors (in parenthesis) are clustered at the firm level. Age of a firm is reported in years. Contest participated refers to the numbers of contests that a firm qualified for during the year. The size of a firm are a set of dummies that control for the size (as defined by the bureau of companies of Ecuador) of the firm. The regional controls include: local GDP and construction permits issued during the year. P values $*p < .1$, $**p < .05$, $***p < .01$

Table 6: Average difference in government sales between winners and runner-ups of the *menor cuantia* contest

Sales-Winners	Sales-Runner-Ups	Difference	P-Value	Year
Year of shock				
43659.34	120620	-76960.66	0.008343	2009
140253.7	268325	-128071.3	0.064538	2010
121272.9	203820.3	-82547.4	0.013566	2011
153569.6	250319.2	-96749.6	0.12826	2012
1 Year after shock				
188835	230421.6	-41586.6	0.686347	2009
192870	226931.3	-34061.3	0.516806	2010
352894.1	407545.5	-54651.4	0.657602	2011
191365	270290.3	-78925.3	0.196067	2012
2 Years after shock				
187444.5	238895.5	-51451	0.466527	2009
432706.2	493418	-60711.8	0.708223	2010
233369.1	328853.3	-95484.2	0.174268	2011

¹ The following table presents the results from a t-test difference in means. The term “Sales-Winners” and “Sales-Runner-Ups” refer to all government sales outside of the *menor cuantia* process for firms that won and lost in the *menor cuantia* process, respectively. The column “Difference” denotes the differences in sales between winners and runner-ups. The column “P-value” denotes the significance level.

Table 7: Regression results by year

Dependent Variable	Revenue Growth		Wage Growth		Fixed Assets Growth		Current Assets Growth	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Results for 2010								
Winner	0.640*** (0.186)	0.645*** (0.189)	0.101 (0.111)	0.103 (0.112)	0.354** (0.137)	0.353** (0.145)	0.373** (0.165)	0.349** (0.164)
Age of firm		-0.001 (0.001)		0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)		-0.001*** (0.000)
Observations	272	272	227	227	275	275	409	409
R^2	0.042	0.070	0.004	0.017	0.025	0.043	0.012	0.065
Results for 2011								
Winner	0.490** (0.199)	0.546*** (0.202)	0.255** (0.123)	0.242** (0.121)	-0.024 (0.135)	-0.005 (0.133)	0.306* (0.161)	0.292* (0.162)
Age of firm		-0.000 (0.001)		-0.002*** (0.000)	-0.001*** (0.000)	-0.001** (0.000)		-0.001 (0.001)
Observations	301	301	244	244	280	280	433	433
R^2	0.019	0.044	0.017	0.062	0.019	0.048	0.008	0.017
Results for 2012								
Winner	0.363 (0.263)	0.249 (0.257)	-0.123 (0.106)	-0.100 (0.104)	0.185 (0.150)	0.208 (0.163)	0.382** (0.168)	0.353** (0.171)
Age of firm		-0.001* (0.001)		-0.001 (0.000)	-0.000 (0.000)	-0.000 (0.000)		-0.002*** (0.001)
Observations	282	282	237	237	244	244	436	436
R^2	0.007	0.042	0.006	0.071	0.008	0.016	0.012	0.027

¹ Least squares estimation of the effects of winning a procurement contract on firm growth, by year. The dependent variables is the growth (log differences) of: revenue (columns 1 and 2), wage expense (columns 3 and 4), fixed assets (columns 5 and 6), and current assets (columns 7 and 8). The variable winner is a dummy variable taking the value 1 if a firm won a contest at time t and 0 otherwise. Standard errors (in parenthesis) are clustered at the firm level. Age of a firm is reported in years. Contest participated refers to the numbers of contests that a firm qualified for during the year. The size of a firm are a set of dummies that control for the size (as defined by the bureau of companies of Ecuador) of the firm. The regional controls include: local GDP and construction permits issued during the year. P values $*p < .1$, $**p < .05$, $***p < .01$

Table 8: Regression results alternative growth definition

Dependent Variable	Revenue Growth		Wage Growth		Fixed Assets Growth		Current Assets Growth	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Winner	0.249*** (0.072)	0.225*** (0.071)	0.102* (0.061)	0.079 (0.059)	0.154** (0.065)	0.139** (0.065)	0.256*** (0.055)	0.240*** (0.055)
Age of firm		-0.001*** (0.000)		-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)		-0.001*** (0.000)
Observations	1039	1039	899	899	870	870	1262	1262
R^2	0.012	0.064	0.003	0.058	0.033	0.041	0.016	0.047

Least squares estimation of the effects of winning a procurement contract on firm growth. The dependent variables is the growth, defined as $(\frac{y_t - y_{t-1}}{.5*(y_t + y_{t-1})})$ of: revenue (columns 1 and 2), wage expense (columns 3 and 4), fixed assets (columns 5 and 6), and current assets (columns 7 and 8). The variable winner is a dummy variable taking the value 1 if a firm won a contest at time t and 0 otherwise. Standard errors (in parenthesis) are clustered at the firm level. Age of a firm is reported in years. P values $*p < .1$, $**p < .05$, $***p < .01$

Table 9: Regression results, levels

Dependent Variable	Gross Revenues		Wage Expense		Fixed Assets		Current Assets	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Winner	1.443*** (0.244)	1.337*** (0.228)	0.953*** (0.216)	0.922*** (0.200)	0.315 (0.239)	0.272 (0.221)	0.573*** (0.171)	0.488*** (0.153)
Age of firm		0.003*** (0.001)		0.004*** (0.001)		0.005*** (0.001)		0.003*** (0.001)
Observations	1778	1771	1778	1771	1778	1771	1778	1771
R^2	0.020	0.149	0.011	0.146	0.001	0.185	0.006	0.196

Least squares estimation of the effects of winning a procurement contract on firm growth. The dependent variables are the log dollar amount (as reported in the balance sheet) of revenues (columns 1 and 2), wage expense (columns 3 and 4), fixed assets (columns 5 and 6), and current assets (columns 7 and 8). The variable winner is a dummy variable taking the value 1 if a firm won a contest at time t and 0 otherwise. Standard errors (in parenthesis) are clustered at the firm level. Age of a firm is reported in years. P values $*p < .1$, $**p < .05$, $***p < .01$

Table 10: Realized vs. expected frequency distributions

<i>Contracts won</i>	<i>Expected</i>	<i>Actual</i>
0	2186	2173
1	1966	1955
2	872	888
3	423	477
4	272	271
5	154	155
6	105	118
7	73	66
8	40	52
9	25	27
10	21	24
11	16	19
12	12	6
+13	25	34

Pearson χ^2 Pr= .242

¹ The following table presents the results of a χ^2 difference in distribution test between the theoretical and actual number of times providers in the *menor cuantia* process were expected to win contracts. The derivation of the theoretical distribution is presented in proposition 2.

Table 11: Expected vs. Actual distribution

<i>Year</i>	<i>Expected vs Actual</i>	
	<i>2010</i>	
<i>2009</i>	<i>Winner</i>	<i>Loser</i>
Winner	979-958	261-282
Runner-up	650-619	393-424
<i>Pearson χ^2 Pr= .396</i>		
	<i>2011</i>	
<i>2010</i>	<i>Winner</i>	<i>Loser</i>
Winner	2157-2151	630-636
Runner-up	447-468	535-514
<i>Pearson χ^2 Pr= .816</i>		
	<i>2012</i>	
<i>2011</i>	<i>Winner</i>	<i>Loser</i>
Winner	1817-1874	511-454
Runner-up	438-461	350-327
<i>Pearson χ^2 Pr= .132</i>		

¹ The following table presents the results of a χ^2 difference in distribution test between the theoretical and actual number of times providers in the *menor cuantia* process were expected to win contracts. The test look at individuals that qualified for a random contest during they years 2009 and 2010, 2010 and 2011, and 2011 and 2012. The derivation of the theoretical distribution is presented in proposition 3.